

The attached Appendix includes marked-up copies of each rewritten claim (37 C.F.R. §1.121(c)(1)(ii)).

I. Restriction Requirement

At the outset, Applicants respectfully traverse the treatment, by the Office Action, of Applicants' traversal of the restriction requirement as being without traverse.

Applicants respectfully submit that the traversal was distinct and specific in arguing that:

the subject matter of all claims 1-24 is sufficiently related that a thorough search for the subject matter of any one Group of claims would encompass a search for the subject matter of the remaining claims. Thus, it is respectfully submitted that the search and examination of the entire application could be made without serious burden. See MPEP §803 in which it is stated that "if the search and examination of the entire application can be made without serious burden, the Examiner must examine it on the merits even though it includes claims to distinct or independent inventions" (emphasis added). It is respectfully submitted that this policy should apply in the present application in order to avoid unnecessary delay and expense to Applicant and duplicative examination by the Patent Office.

See, Applicants' response filed on February 27, 2002.

Accordingly, Applicants respectfully request that the next Office Action recognize Applicants' response to the restriction requirement as being with traverse.

II. Prior Art Rejections

The Office Action rejects claims 1-4 under 35 U.S.C. §103 as being obvious over U.S. Patent No. 5,166,089 to Chen et al. in view of U.S. Patent No. 5,235,201 to Honna et al. U.S. Patent No. 5,877,534 to Williams et al.; rejects claim 5 under 35 U.S.C. §103 as being

obvious over Chen, Honna and Williams, and further in view of JP 406224376A to Uchizumi et al.; rejects claims 6 and 7 under 35 U.S.C. §103 as being obvious over Chen, Honna and Williams, and further in view of U.S. Patent No. 5,949,094 to Amerasekera; and rejects claims 20-23 under 35 U.S.C. §103 as being obvious over Chen in view of Williams and U.S. Patent No. 4,336,489 to Fredericksen. These rejections are respectfully traversed.

With respect to claim 1, Applicants respectfully submit that the Office Action fails to make a prima facie case of obviousness at least because there is no motivation, suggestion, or teaching to modify the disclosure of Chen by the disclosure of Honna.

Specifically, Chen discloses a system for protecting the input to integrated devices from electrostatic discharge (ESD). In particular, Chen discloses that protection is achieved by connecting the anode of a Shockley diode 22¹ and the emitter of a bipolar transistor 24 to the gate 18 of the MOS transistor 17 to be protected. See, Chen, column 3, lines 37-43 and Figs. 1 and 2. The Office Action recognizes that the disclosure of Chen at least fails to disclose the creation of a third diffusion layer, which in combination with the first diffusion layer (contended to correspond to element 19 of Chen) creates a Zener diode, as recited in the context of independent claim 1. See, for example, the first sentence of the last paragraph on page 3 of the Office Action.

The Office Action contends, however, that this failure in the disclosure of Chen is remedied by the disclosure of Honna. Specifically, the Office Action contends that Honna discloses a Zener diode comprising diffusion region 22 and deeper diffusion region 23 (as,

¹ The disclosure of Chen explains diode 22 as being a four layer two-terminal SCR latching type device, see, for example, Chen, column 3, lines 40-41, and gives its equivalent circuit in Fig. 1. The disclosure of Chen uses the term Schottky Diode, which Applicants believe is in error since the description and equivalent circuit of diode 22 is that of a Shockley diode, see, for example, "Physics of Semiconductor Devices," 2nd edition, by Sze, pp 190-193 (1981), and "Integrated Electronics," by Millman and Halkias, pp 708-710 (1972), both attached hereto.

for example, shown in Fig. 12) to form surge protection for MOS transistor. See, the last paragraph on page 3 of the Office Action.

Contrary to the contention by the Office Action, however, the disclosure of Honna shows elements 22 and 23 as being part of the prior art having a problem and to be improved upon by the disclosure of Honna, not what is disclosed by Honna for protection from surges. See, for example, Fig. 1 and 2 showing elements in the prior art corresponding to elements 22 and 23 of figures showing the disclosure of Honna; see, also column 1, line 11, to column 2, line 68.

Specifically, Honna discloses using circuit h, which is disclosed as including elements 12-15 as explained with respect to Figs. 3 and 4, to protect against surges. See, for example, column 4, lines 3-39. In particular, Honna discloses using two separate diodes to form the protection circuit h.

Accordingly, Honna would motivate using the surge protection circuit h to protect an MOS transistor already having a Zener diode in the layout Honna considers to be conventional. Such a motivation, however, fails to motivate modifying the disclosure of Chen, which discloses a different layout than that deemed by Honna as being conventional, to include a third diffusion region, which in combination with the first diffusion layer (contended to correspond to element 19 in the disclosure by Chen) creates a Zener diode, as recited in the context of independent claim 1.

Additionally, Applicants respectfully request clarification regarding the necessity of excluding a silicide layer from a region connecting the first and third regions, as contended by the Office Action, as that would be necessary for the functioning of lateral Zener diode 27/28. Applicants respectfully note that the combination of Chen, Honna, and Williams does not appear to disclose a lateral Zener diode 27/28.

Applicants respectfully submit that claims 2-4 depend directly from claim 1 and, therefore, distinguish over the combination of Chen, Honna, and Williams at least for the reason explained above with respect to claim 1.

With respect to claim 5, Applicants respectfully submit that the Office Action fails to show the disclosure of Uchizumi as providing a motivation, teaching, or suggestion to modify the disclosure of Chen to include a third region, as disclosed in the context of claim 1.

With respect to claims 6 and 7 the Office Action fails to show the disclosure of Amerasekera as providing a motivation, teaching, or suggestion to modify Chen to include a third region, as disclosed in the context of claim 1.

At least for the above explained reasons, therefore, Applicants respectfully request reconsideration and withdrawal of the rejection of claims 1-7.

With respect to claims 20-23, Applicants respectfully submit that the Office Action fails to make a prima facie case of obviousness because the combination of Chen, Fredericksen, and Williams at least fails to disclose a semiconductor device including, inter alia, a third diffusion region that is formed between a second isolation region and a first diffusion region of a MOS transistor, the third diffusion region being adjacent to a surface of the semiconductor substrate and makes up a Zener diode by the PN junction together with the first diffusion region of the MOS transistor, as recited in the context of claim 20.

Additionally, Applicants respectfully submit that the Office Action fails to present a motivation, suggestion, or teaching to modify the disclosure of Chen to include the feature recognized as missing.

Specifically, the Office Action recognizes that the disclosure of Chen fails to disclose a semiconductor device at least including a third diffusion region that is formed between a second isolation region and a first diffusion region of a MOS transistor, the third diffusion region being adjacent to a surface of the semiconductor substrate and makes up a Zener diode

by the PN junction together with the first diffusion region of the MOS transistor, as recited in the context of claim 20. See, for example, the first sentence of the second full paragraph on page 9 of the Office Action. The Office Action, however, contends that Fredericksen remedies this deficiency because it discloses using a Zener diode.

Contrary to the contention by the Office Action, however, Fredericksen discloses that the Zener diode formed by elements 27 and 28, is created in an isolated region. See, for example, the abstract and column 1, lines 37-40. Accordingly, Fredericksen fails to disclose forming the Zener diode as a combination between a third diffusion region and a first diffusion region forming the MOS transistor. Therefore, Fredericksen fails to remedy the recognized deficiency in Chen.

Additionally, since Fredericksen fails to remedy the recognized deficiency, it also fails to provide a motivation, suggestion, or teaching for modifying the disclosure of Chen to remedy its recognized deficiency.

Claims 21-23 depend directly or indirectly from claim 20, and therefore distinguish over the combination of Chen, Fredericksen, and Williams at least for the reason explained with respect to claim 20.

Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejection of claims 20-23.

Claims 25 and 26 depend from claims 1 and 20, respectively, and are allowable at least for the reasons explained with respect to claims 1 and 20, respectively.

III. CONCLUSION

In view of the foregoing amendments and remarks, Applicants submit that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 1-26 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in better condition for allowance, the Examiner is invited to contact Applicants' undersigned representative at the telephone number listed below.

Respectfully submitted,



James A. Oliff

Registration No. 27,075

Hrayr A. Sayadian

Registration No. 46,491

JAO:HAS/scg

Attachments:

Appendix

"Physics of Semiconductor Devices," 2nd edition, by Sze, pp. 190-193 (1981)

"Integrated Electronics," by Millman and Halkias, pp. 708-710 (1972)

Amendment Transmittal

Date: July 11, 2002

OLIFF & BERRIDGE, PLC
P.O. Box 19928
Alexandria, Virginia 22320
Telephone: (703) 836-6400

**DEPOSIT ACCOUNT USE
AUTHORIZATION**

Please grant any extension
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APPENDIX

Changes to Claims:

Claims 25 and 26 are added.